

A NEW SPECIES OF *CAREX*
(CYPERACEAE: TRIQUETRAE) FROM
THE CHISOS MOUNTAINS, TEXAS, AND A
KEY TO SPECIES OF SECTION *TRIQUETRAE*

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ABSTRACT

Carex lativena, section *Triquetrae*, is described from the Chisos Mountains in southern Brewster County, Texas. It was found in an open semi-dry hardwood-conifer forest. It differs from its putative closest relative, *C. planostachys*, in having more numerous and shorter basal peduncled pistillate spikes; shorter culms; perigynia that are conspicuously obovate, less pubescent and with shorter, abruptly bent beaks; achenes that are apically retuse, brown in color; and differing in achene micromorphology. Both species are caespitose in habit. The difference being that the caespitose clumps of *C. lativena* is composed of individual plants that can be pulled apart from each other. A key to the species of section *Triquetrae* is included.

Carex section *Triquetrae* Carey is a New World group of species found in semi-xeric to mesic habitats. This section ranges from northern Central America through North America in temperate and warmer regions (Mackenzie 1935). This section now includes six species: *C. dasycarpa* Muhlenberg, *C. hirtifolia* Mackenzie, *C. lativena* S.D. Jones & G.D. Jones, *C. planostachys* Kunze, *C. tenax* Chapman, and *C. triquetra* Boott. Section *Triquetrae* is characterized by having narrow leaf blades; bract of the lowermost non-basal spike with a well-developed blade; trigonous achenes that fill the perigynia; a short, thick style, and 3 stigmas.

The placement of *C. lativena* into section *Triquetrae* is one of convenience at this time. It is beyond the scope of this paper to realign sections. However, we do suggest that section *Triquetrae* may be polyphyletic. *Carex lativena* and its closest putative relative *C. planostachys* are likely more aligned with the Eurasian and northern African species *C. halleriana* Asso. *Carex dasycarpa*, *C. tenax*, and possibly *C. triquetra* show a close relationship to each other, but not to *C. lativena*, *C.*

planostachys, or *C. hirtifolia*. *Carex hirtifolia* appears not to be closely related to any of the taxa presently aligned in section *Triquetrae*.

***Carex lativena* S.D. Jones & G.D. Jones, sp. nov. BROAD-VEIN CAREX (Fig. 1).**

Plantae cespitosae; culmis fertilis 4–12 cm altis. Foliis 3–5, laminis maximam partem (5) 19–31 cm longis, (0.5–) 1.2–2.0 mm latis planis striatis; paginae adaxialae sparsim antrorse scabridiusculae, proximaliter maximam partem antrorse scabridiusculae distaliter costa impressa; paginae abaxialae glabrae, proximaliter costa elevata distaliter carinascentibus, margine minute asperato vel antrorse scabridiusculo; vaginae 1.5–5 cm longae culmos et bases pedunculorum plus minusve arcte involventibus; vaginis basales albis vel viridis pallidis striatis membranaceis minute antrorse scabridiusculis. Inflorescentiis 4–6 spicis; culmis fertilis 2–3 spicis basales pistillatis et 3 spicis terminalibus; spicis basales 2–3 pistillatis 3–4 cm longis ad basim ex culmis fertilis exorientibus; spicis terminalibus primis pistillatis 5–7 mm longis, 3–6 perigynio, deinde spicis terminalibus staminatis vel spicis gynaeandris vel spicis immixtis floribus maribus et femineis 7–8 mm longis, spicis pistillatis pedunculo 2–3 mm longo et spicis staminatis pedunculo 3–4 mm long. Squamis spicis pistillatis glabris 3.5–4.2 mm longis 1.3–2.0 mm latis; squamis staminatis glabris 4–5 longis 1.5–2.1 mm latis. Perigynio adpresso (3.0–) 3.5–3.8 (–4.0) mm longo (1.1–) 1.4–1.9 (2.1) mm lato, trigono, faciebus duobus apicalis convexis atque facie laterali plani vel leviter concavi, plerumque stramineo aliquam pallidi viridi, plerumque glabro sed sparsim hispidulo apicaliter. Rostris hispidulis 0.1–0.3 mm longis, minute bidentatis abrupte flexis. Achaeniis 2.0–2.4 mm longis (1.1–) 1.4–1.9 mm latis obovatis (vel ellipticis) trigonis per perigynium arcte involutis, cinnamomeis vel “Prout’s brown,” laevis vel papillosis in magnificatio alto; superficies duabus convexis et superficie una concava. Stylo marcescenti recti; stigmatibus tribus brunneis; antheris tribus 2.1–2.4 mm longis, luteolis.

Plants caespitose with stiff fibrous dark brown roots not felted with root hairs, and lacking inter-connecting rhizomes; fertile culms 4–12 cm tall, conspicuously trigonous with flared, antrorsely scaberulous margins. Leaves 3–5 per fertile culm, all basal, sheaths persistent and becoming fibrous with age, forming a brown fibrous base 3–5 cm tall; blades (5–) 9–31 cm long, (0.5–) 1.2–2.0 mm wide, flat, striate; adaxial surface sparsely antrorsely scaberulous proximally becoming predominantly antrorsely scaberulous distally with midvein being impressed; abaxial surface glabrous with midvein raised proximally becoming strongly keeled distally, the margins minutely roughened to antrorsely scaberulous; leaf sheaths 1.5–5 cm long, more or less tightly enveloping culms and basal peduncles, basal leaf sheaths of previous years’ leaves Mikado brown (Smithe 1975), leaf sheaths with blades (uppermost leaves) white to pale green, striate, membranous, minutely antrorsely scaberulous; apex of inner band of sheaths truncate, or minutely concave, not callosed or discolored; ligules absent or to 1 mm long, white-membranous, when elongated more or less linguliform. Vegetative shoots 3–5 cm tall; leaves 3–5, similar to those of fertile culm. Inflorescence of 4–6 spikes; lowest bract of fertile culm with a sheath 2.5–3.0 mm long; blade 1–18 mm long, ca. 0.5 mm wide, shorter than to slightly exceeding the inflorescence; fertile culm of 2–3 basal pistillate spikes and 3 terminal spikes. Basal 2–3 spikes pistillate, 3–4 cm long arising at base of fertile culm with obscurely trigonous peduncles with two edges antrorsely scaberulous, spike

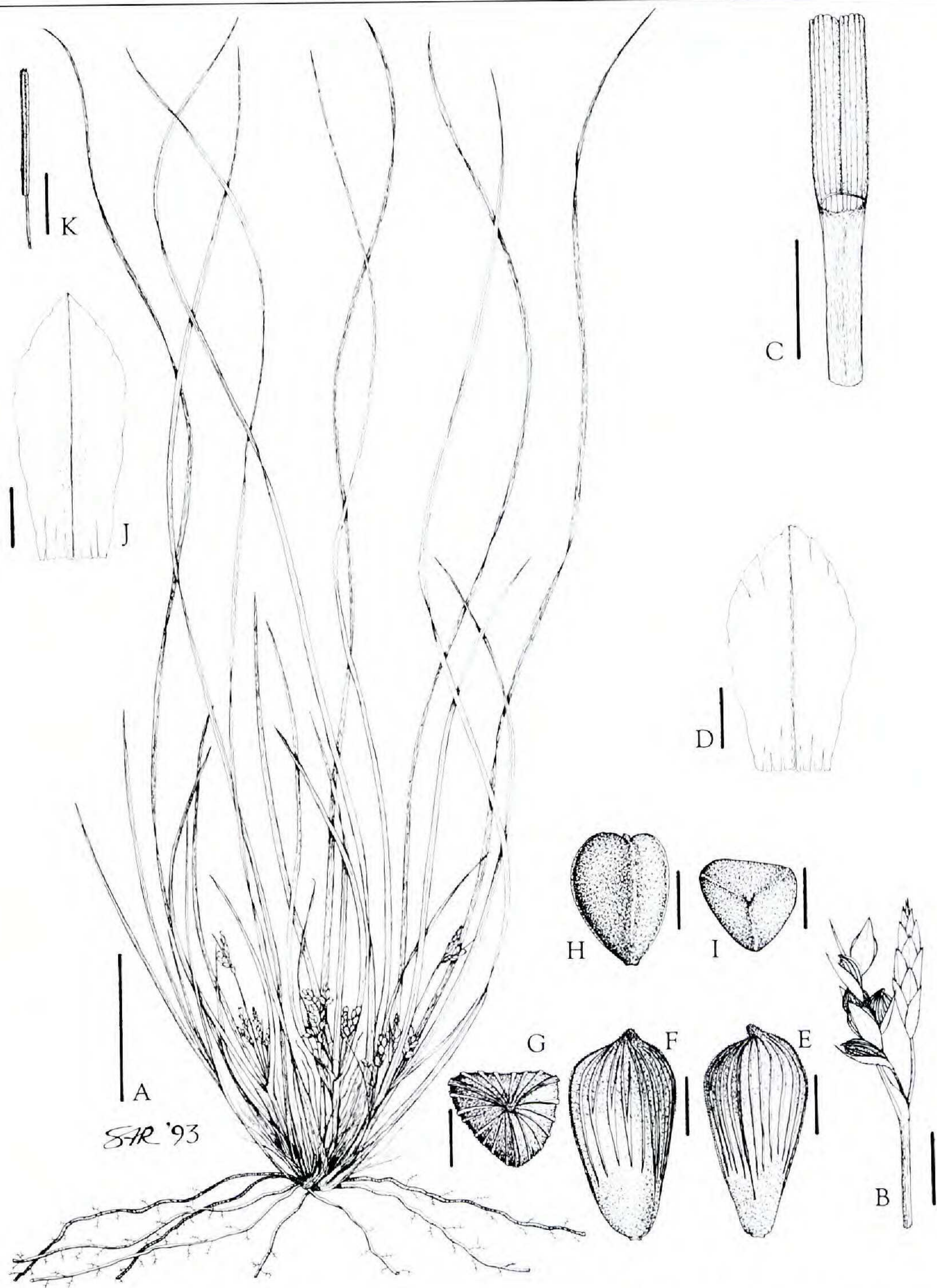


FIG. 1. *Carex lativena*, from S. & G. Jones 6523 (HOLOTYPE: MICH). A. Habit. B. Inflorescence. C. Sheath and Ligule. D. Pistillate scale. E. Perigynium, side view. F. Perigynium, front view. G. Perigynium, top view. H. Achene, front view. I. Achene, top view. J. Staminate scale. K. Anther. Bar equals 5 cm in A, 5 mm in B–C, and 1 mm in D–K.

arising from uppermost leaf sheath or beginning ca. 1 cm above; lowermost spikes with (4–) 6 perigynia. Lowermost and penultimate terminal spikes pistillate, 5–7 mm long, with 3–6 perigynia; uppermost terminal spike staminate,

gynaecandrous, or intermixed with both male and female flowers, 7–8 mm long; lowermost and penultimate spikes on a 2–3 mm long peduncle and the uppermost spike on a 3–4 mm long peduncle. Peduncle of lowermost and penultimate terminal pistillate spikes are plano-convex with antrorsely scaberulous edges; peduncle of uppermost terminal spike is sharply trigonous and antrorsely scaberulous. Pistillate scales glabrous 3.5–4.2 mm long, 1.3–2.0 mm wide, obovate, truncate basally, acuminate apically, midvein frequently excurrent to ca. 0.3 mm long; midvein occasionally scaberulous distally; pistillate scales with broad hyaline margins, light green in center with 3–5 conspicuous veins and occasionally with 3–5 smaller lateral veins. Staminate scales glabrous, 4–5 mm long, 1.5–2.1 mm wide, oblong to narrowly obovate, truncate basally, acuminate apically, midvein occasionally excurrent to 0.2 mm long; staminate scales mostly hyaline, with a light brown area around midvein ca. 0.2 mm wide, numerous faint lateral veins. Perigynia appressed, (3.0–) 3.5–3.8 (–4.0) mm long, (1.1–) 1.4–1.9 (–2.1) mm wide, obovate, tapering basally, trigonous with two apical sides convex and one side flat to slightly concave, mostly stramineous with some pale green color, mostly glabrous but sparsely hispidulous apically, faces of perigynia with 5–9 conspicuous veins, mostly 0.1 mm wide, veins on each adaxial corner even more conspicuous. Beaks hispidulous, 0.1–0.3 mm long, minutely bidentate, abruptly bent. Achenes 2.0–2.4 mm long, (1.1–) 1.4–1.9 mm wide, obovate (or elliptic), trigonous, tightly enveloped by the perigynium, cinnamon-brown or Prout's brown (Smithe 1975), smooth to minutely papillose under high magnification, angles beige or cream colored; two of the faces usually convex and one face flat or concave. Style withering, straight. Achene epidermal cells (Fig. 5a) non-isodiametric, single central body in each cell (\pm conical), with a strongly concave silica platform of a bumpy texture and without satellites at the cell angles; anticlinal wall, appearing as a double weld, separates each cell. Stigmas 3, brown. Stamens 3, anthers 2.1–2.4 mm long, pale yellow.

TYPE: U.S.A. TEXAS. **Brewster Co.:** Big Bend National Park: 0.8 km southward on the Pinnacle's trail towards Boot Springs from the trail head near the Post Office, ca. 1735 m, 19 Apr 1991, *S. & G. Jones* 6523 (HOLOTYPE: MICH; ISOTYPES: BRIT/SMU, TAES, TEX, US, VDB). The plants collected from Big Bend National Park (BIBE) have been assigned a National Park accession number 759 in addition to the collectors' accession number.

Additional specimens (PARATYPES): ARIZONA. **Cochise Co.:** Scheelite Canyon in the Huachuca Mountains, shaded slope in canyon bottom woodland, ca. 1770 m, 7 May 1991, *J. Bowers* 3484 and *S. McLaughlin* (ARIZ). TEXAS. **Brewster Co.:** steep limestone slopes, main canyon on west side of Santiago Mts., ca. 8 mi SE of Santiago Peak, 5 Apr 1948, *R. McVaugh* 7849 (MICH); Big Bend National Park; Pine Canyon, ca. 1735 m, 21 Apr 1991, *S. & G. Jones* 6547 (SRSC). **Runnels Co.:** 0.3 mi N on FR 382 from its jct. with county road 189, S of Lawn at Ranger Peak, ca. 704 m, calcareous loamy clay soil, 28 Mar 1992, *S. & G. Jones* 8194 (ASTC, BRIT/SMU, ctb = Charles T. Bryson's pers. herb., MICH, mjo = Michael J. Oldham's pers. herb., SAT, sdj = Stanley D. Jones' pers. herb., SWT, vem = Vern E. McNeilus' pers. herb., VSC, UTEP). **Taylor Co.:** on N slope of Edwards Escarpment at Camp Barkeley, rocky soil, dominated by juniper, 28 Mar 1943, *W. Tolstead* 6915 (BRIT/SMU, MICH, TAES).

Carex lativena was found growing under and near junipers and piñon pines in an open, semi-dry mixed hardwood conifer forest on a north-facing slope at an elevation of ca. 1735 m. The soils are of the Mainstay-Liv-Brewster association, noncalcareous, gravelly silt loam, grayish brown, neutral with igneous rock outcrops. Associated species include *Astragalus mollissimus* Torr., *Castilleja nervata* Eastw., *Poa fendleriana* (Steud.) Vasey, *P. bigelovii* Vasey & Scribner, *Carpochaete bigelovii* Gray, *Stipa tenuissima* Trin., *Carex geophila* Mackenzie, *Conopholis alpina* Liebm., *Elymus elymoides* (Rafin.) Swezey, *Ceanothus greggii* Gray, *Garrya ovata* Benth., *Galium pilosum* Ait., *Fraxinus cuspidata* Torr., *Pinus cembroides* Zucc., *Acer grandidentatum* Nutt., *Juniperus flaccida* Schlecht., *J. ashei* Buchloz, *Cheilanthes tomentosa* Link, *C. eatonii* Baker in Hook. & Baker, *Pellaea atropurpurea* (L.) Link, *P. intermedia* Mett. ex Kuhn, *Notholaena sinuata* (Lag. ex Swartz) Kaulf., *Arbutus xalapensis* Kunth in H.B.K., and *Quercus* spp. The following key is for species of section *Triquetrae*.

KEY TO SECTION *TRIQUETRAE*

- 1. Perigynia abruptly contracted into a beak 1.0–1.3 mm long (Fig. 2b); culms trigonous, angles flattened into wings, sparsely pilose; leaves pilose throughout *C. hirtifolia*
- 1. Perigynia tapering to the beak, or if abruptly contracted, the beaks less than 0.6 mm long (Figs. 2a, c–f); culms trigonous, rounded or sharp, but not flattened into wings, glabrous to antrorsely scaberulous; leaves glabrous to scaberulous or pilose basally in *C. dasycarpa*.
 - 2. Faces of perigynia with 4– many conspicuous veins; plants of central-eastern U.S., Guatemala, Mexico, or eastern Canada, but not California nor Baja California.
 - 3. Culms with basal spikes
 - 4. Achenes brown, apices retuse, 2 of the 3 faces usually convex; basal spikes 2–3 per culm; faces of perigynia with 5–9 conspicuous veins of about the same width (0.1 mm) with 1–2 thinner (Fig. 2c) *C. lativena*
 - 4. Achenes light green to golden yellow (rarely light brown), apices obtuse, not retuse, 2 of the 3 faces usually concave; basal spikes 0–1 (–2) per culm; faces of the perigynia with (4–) 6 (–8) conspicuous veins less than 0.1 mm wide except for the two veins on the adaxial corners which are ca. 0.1 mm wide (Fig. 2d) *C. planostachys*
 - 3. Culms without basal spikes.
 - 5. Perigynia densely white-villous except at base (Fig. 2a); achene body 2.0–2.7 mm long, long-stipitate (Fig. 3a) *C. dasycarpa*
 - 5. Perigynia puberulent (Fig. 2e); achene body 3.0–3.3 mm long, sessile (Fig. 3b) *C. tenax*
 - 2. Faces of perigynia with (0–) 1 (–3) conspicuous veins (Fig. 2f); plants of California south into northern Baja California *C. triquetra*

In addition to key characters separating *C. lativena* (Fig. 1) from its closest putative relative *C. planostachys* (Fig. 4), it differs in not having inter-connecting rhizomes. Both are cespitose in habit, but the cespitose clumps of *C. lativena* are

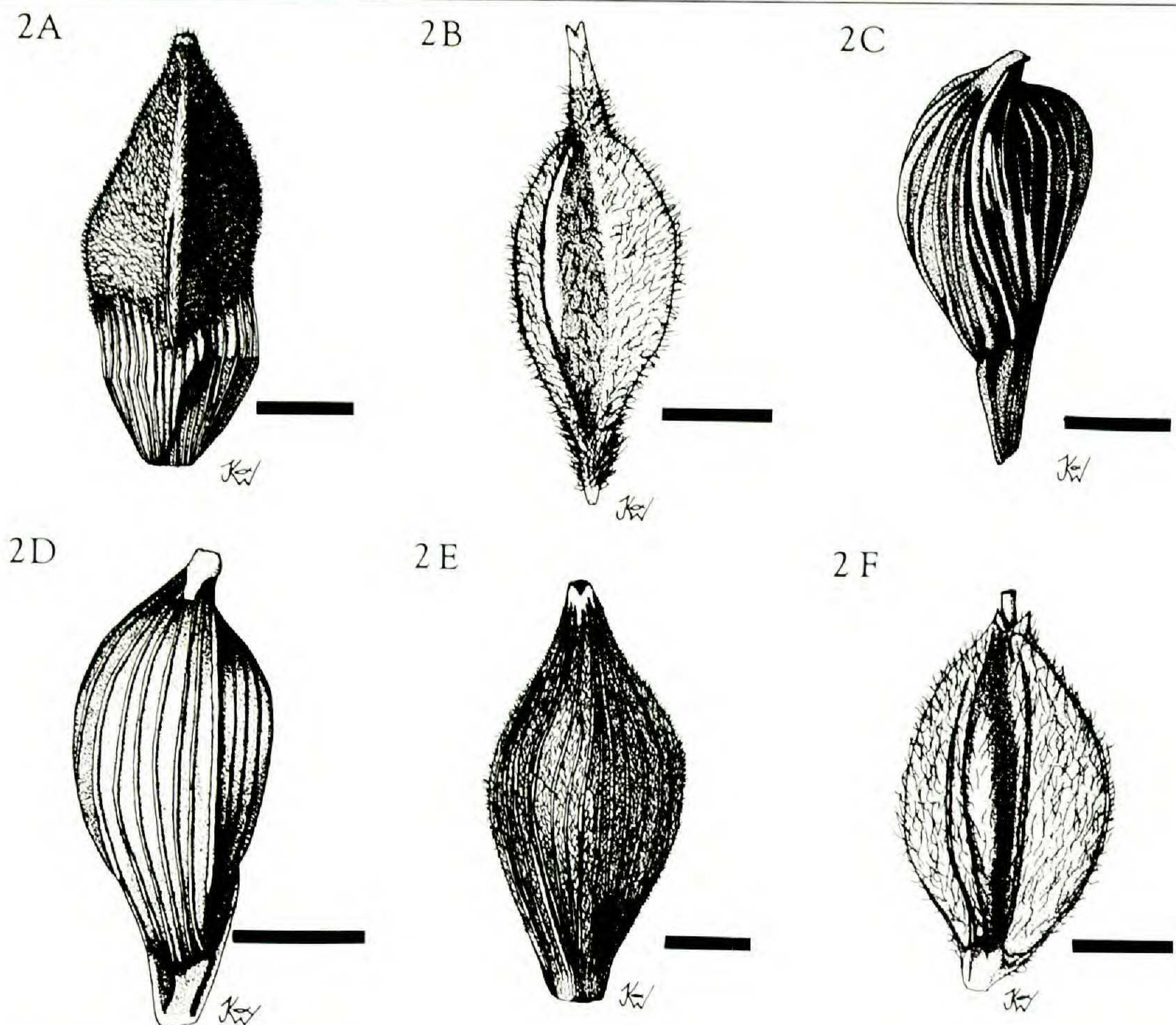


Fig. 2. A–F. Perigynia of *Carex* Section *Triquetrae*. A. *C. dasycarpa*, from R.E.C. Naczi 2766 (sdj = pers. herb. of Stanley D. Jones). B. *C. hirtifolia*, from H.E. Ables 87908 (TAES). C. *C. lativena*, from S. & G. Jones 6523 (isotype: TAES). D. *C. planostachys*, from S. & G. Jones 1269 (TAES). E. *C. tenax*, from S. & G. Jones 2600 and T. Powell (TAES). F. *C. triquetra*, from F.R. Fosberg S4645 (TAES). Bar equals 1 mm in A–F.

composed of individual plants that can be pulled apart from each other. Whereas, with *C. planostachys*, most of the plants of a cespitose clump are inter-connected by rhizomes. *Carex lativena* also differs in having more numerous and shorter basal peduncled pistillate spikes; shorter culms; perigynia that are conspicuously obovate, less pubescent and with shorter, abruptly bent beaks. *Carex planostachys* has more or less fusiform perigynia that are uniformly pubescent, and longer beaks, that are only slightly curving. The achenes also differ micromorphologically. The achenes of *C. lativena* (Fig. 5a) and *C. planostachys* (Fig. 5b) have a central silica body with no satellites, and a conspicuously concave silica platform. However, *C. lativena* has a conspicuous anticlinal wall appearing as a double weld, and a bumpy textured silica platform (Fig. 5a), while *C. planostachys* has an inconspicuous anticlinal wall, and a smooth textured silica platform (Fig. 5b).

The conspicuous broad veins on the faces of the perigynia of *C. lativena* are the

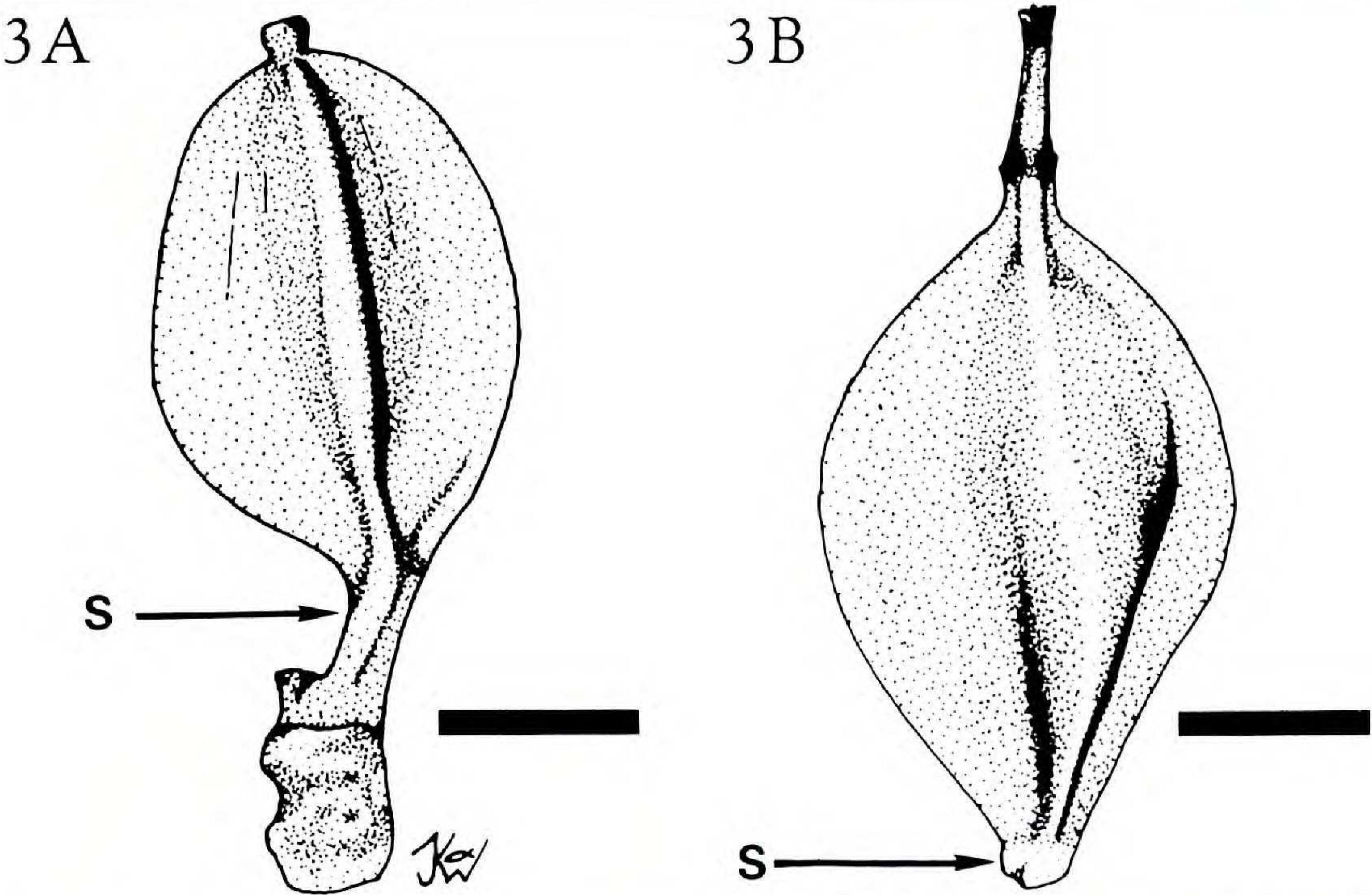


Fig. 3. A, B. Achenes. A. *Carex dasycarpa*, from R.F.C. Naczi 2766 (sdj = pers. herb. of Stanley D. Jones). B. *C. tenax*, from S. & G. Jones 2600 and T. Powell (TAES). S. stipe. Bar equals 1 mm in A, B.

derivation of both its scientific and common name. It has been collected in Brewster, Runnells, and Taylor counties, Texas, representing three vegetational regions in the state based on Hatch et al. (1990): region 7 (Edwards Plateau), region 8 (Rolling Plains), and region 10 (Trans-Pecos) from where it is described. In addition to being found in three counties in Texas, it has been collected in Cochise County, Arizona, where it was reported new to Arizona as *C. planostachys* by Bowers and McLaughlin (1993). *Carex lativena* was growing in association with *Pinus cembroides* (piñon pine) at the type locality. We suspect that *C. lativena* may have an association with them. However, piñon pine was not present at the Taylor nor Runnells County sites, which are part of the Callahan Divide. Whether, historically piñon pine existed at these sites or not is unclear. Further field studies in piñon pine belts in Texas, adjacent Mexico, and the southwest US are suggested.

ACKNOWLEDGMENTS

The discovery of this new species is the result of research conducted under a BIBE permit. We appreciate Mike Fleming, Resource Management Specialist (BIBE) for providing permits and cooperation throughout this research. We thank Charles T. Bryson (SWSL), Paul A. Fryxell (USDA), A.A. Reznicek (MICH), and J.K. Wipff (TAES) for their manuscript review. We are also grateful

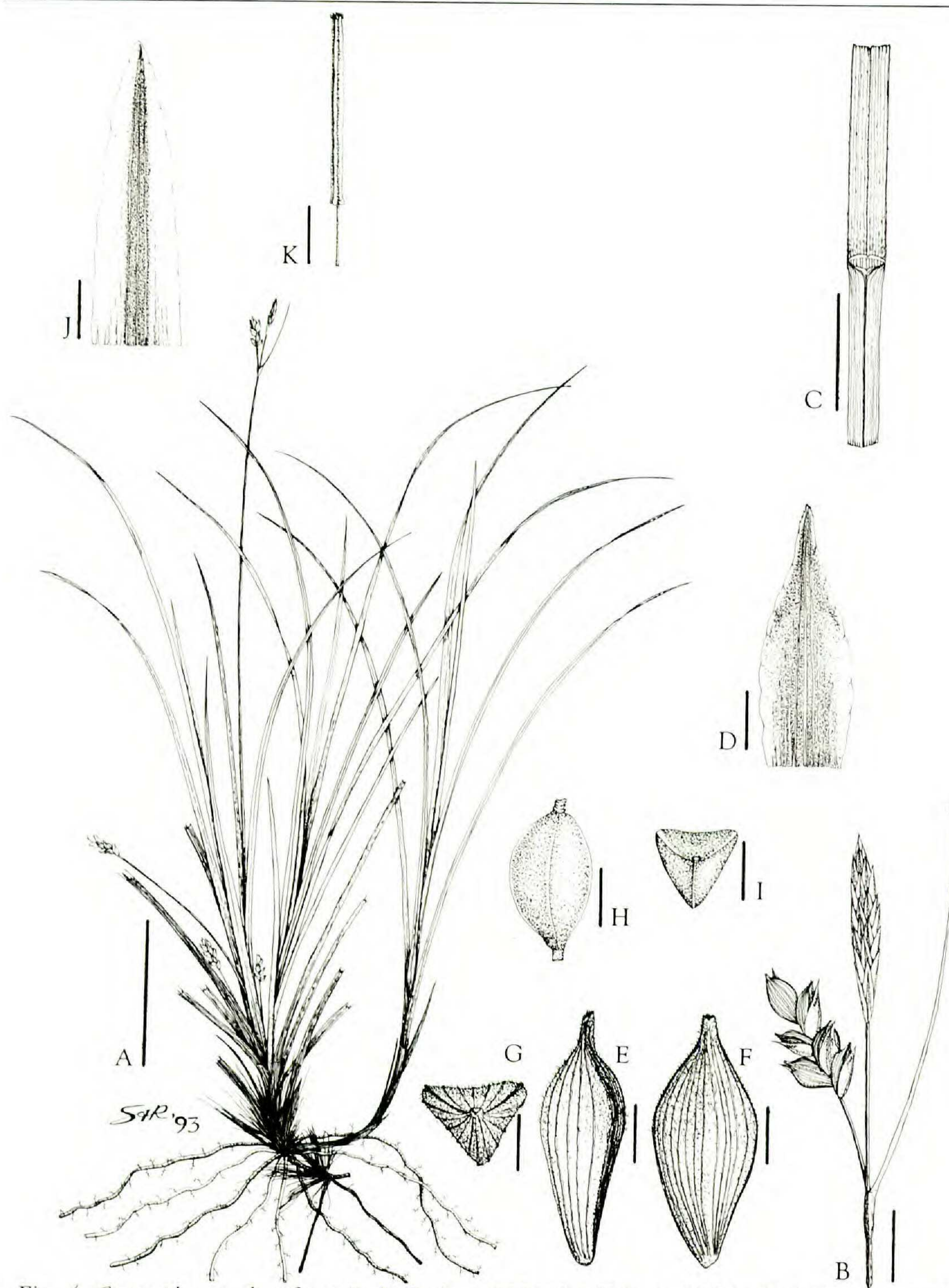


Fig. 4. *Carex planostachys*, from S. & G. Jones 6323 (MICH). A. Habit. B. Inflorescence. C. Sheath and Ligule. D. Pistillate scale. E. Perigynium, side view. F. Perigynium, front view. G. Perigynium, top view. H. Achene, front view. I. Achene, top view. J. Staminate scale. K. Anther. Bar equals 5 cm in A, 5 mm in B, C, and 1 mm in D–K.

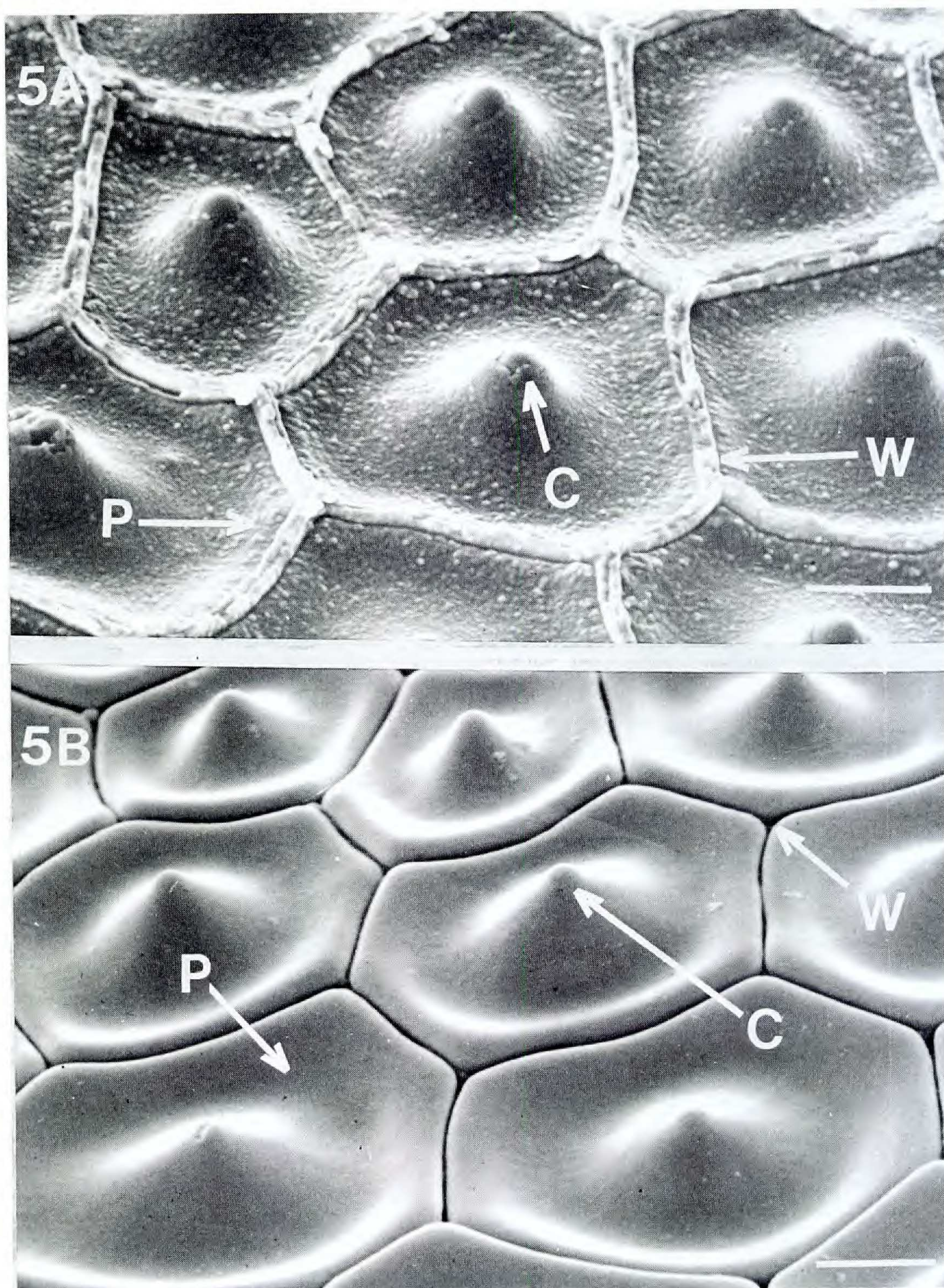


Fig. 5. A. *Carex lativena* achene epidermal cells, SEM micrograph from S. & G. Jones 6523 (isotype: TAES). C. Central body. P. Silica platform. W. Anticlinal wall. Bar equals 10 μ m. B. *C. planostachys* achene epidermal cells, SEM micrograph from S. & G. Jones 6323 (TAES). C. Central body. P. Silica platform. W. Anticlinal wall. Bar equals 10 μ m.

to Paul A. Fryxell for correcting our Latin description, Susan A. Reznicek for the illustration of *C. lativena* and *C. planostachys* (Figs. 1, 4), and to J.K. Wipff for the illustration of Figs. 2 and 3.

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